CLAIMS

We claim:

    1. In a beverage brewing system connectable with source of water and having a brew basket for holding extract ingredient, and a mixing chamber for receipt of both liquid drink extract and a quantity of diluent water for mixing together into a beverage, the improvement being a control system, comprising:

    a flow meter;

    a controllable delivery system for delivering a quantity of water from the source to the brew basket to make the liquid drink extract and from the source to the mixing chamber for mixing with the drink abstract; and

    a controller responsive to the flow meter for selectively controlling the delivery system to deliver only a preselected amount of water to at least one of the brew basket and to the mixing chamber.

2. The beverage brewing system of claim 1 in which

    the delivery system includes a controlled mixing valve for passing water from the source and the flow meter to the mixing chamber, and

    the controller includes means responsive to the flow meter for temporarily storing the actual quantity of water passed through the controlled mixing valve.

3. The beverage brewing system of claim 2 in which

    the delivery system includes a controlled brew valve for passing water from the source and the flow meter to the brew basket, and

the controller includes means responsive to the flow meter for at least temporarily storing the actual quantity of water passed through the controlled brew valve.

4. The beverage brewing system of claim 1 in which

the delivery system includes a controlled brew valve for passing water from the source and the flow meter to the brew basket, and

the controller includes means responsive to the flow meter for storing the quantity of water passed through the controlled brew valve.

5. The beverage brewing system of claim 4 including

a brew water tank, and

a siphon connection between the brew water tank and the brew basket, and in which

the solenoid controlled brew valve passes water to the brew water tank to force an equal quantity of water in the brew water tank to pass to the brew basket through the siphon connection between the brew water tank and the brew basket.

6. The beverage· brewing system of claim 4 including

a brew water tank,

a level sensor in the brew water tank for sensing when the brew water tank is at a preselected siphon level above which water is siphoned off through the siphon connection to the brew basket, and

a heating element for heating the brew water in the brew water tank before it is siphoned off to the brew basket.

7. The beverage brewing system of claim 4 including

a brew water tank with a side and a bottom, and in which

the controlled brew valve is connected to the side of the brew water tank adjacent the bottom of the brew water tank, and

the siphon connection is connected to the brew water tank adjacent the top of the brew water tank.

8.The beverage brewing system of claim 1 including in which

the delivery system includes two controlled valves for respectively passing water from the source of water and flow meter to the brew basket and the mixing chamber, and

said controller controls the valves to prevent both from being open at the same time.

9. The beverage brewing system of claim 8 in which the controller includes

means for storing an output indication of quantity from the flow meter as brew water when the one of the valves connected to the brew water tank is opened and the other one of the valves is closed, and

means for storing an output indication of quantity from the flow meter as mixing water when the other one of the valves connected to the mixing chamber is open and the one valve connected to the brew water tank is closed.

10. The beverage brewing system of claim 1 in which

the controller includes means for storing a preselected total quantity of brew water that is to be passed through the brew basket,

31

means for comparing amounts of brew water being measured by the flow meter with the preselected total quantity of brew water, and

means responsive to the comparing means to stop the delivery system from passing more brew water to the brew water tank when the measured quantity of brew water that has passed to the brew water tank.

11. The beverage brewing system of claim 10 including means for changing the preselected total amount of brew water that is to be passed through the brew basket.

12. The beverage brewing system of claim 10 in which

the controller includes means for storing a preselected total quantity of beverage to be made by mixing water passed directly into the mixing chamber with the beverage extract, and

means for comparing the total quantity of water measured by the flow meter with the preselected total quantity of beverage to be made, and

means responsive to the comparing means to stop the delivery system from passing more water to the mixing chamber when the total measured quantity of water that has passed through the flow meter is equal to the preselected total quantity of beverage to be made.

13. The beverage brewing system of claim 12 including means for selectively changing the preselected total quantity of beverage to be made stored in the storing means.

14. The beverage brewing system of claim 1 in which

the controller includes means for storing a preselected total quantity of mixing water that is to be passed through the brew basket,

means for comparing amounts of mixing water being measured by the flow meter with the preselected total quantity of mixing water, and

means responsive to the comparing means to stop the delivery system from passing more mixing water to the brew water tank when the measured quantity of mixing water that has passed to the brew water tank.

15. The beverage brewing system of claim 14 including means for changing the preselected total amount of mixing water that is to be passed through the brew basket.

16. The beverage brewing system of claim 1 in which the controller includes

means for storing a preselected total quantity of beverage to be made by mixing water passed directly into the mixing chamber with the beverage extract, and

means for comparing the total quantity of water measured by the flow meter with the preselected total quantity of beverage to be made, and

means responsive to the comparing means to stop the delivery system from passing more water to the mixing chamber when the total measured quantity of water that has passed through the flow meter is equal to the preselected total quantity of beverage to be made.

17. The beverage brewing system of claim 16 including means for selectively changing the preselected total quantity of beverage to be made stored in the storing means.

33

18. The beverage brewing system of claim 1 including

a level sensor in the brew water tank for sensing when the water has reached a preselected siphon level above which water will be siphoned from the brew water tank,

means associated with said controller for controlling the distribution system to pass water into the brew water tank until the level reaches the preselected siphon level, and

a siphon connection for passing hot water out from the hot water tank to the brew basket when a substantially equal amount of water from the source is passed through the flow meter and into the brew water tank during a time when the level in the brew water tank is generally at the siphon level.

19. The beverage brewing system of claim 1 including

an electrical heater for heating the water in the brew water tank to a preselected, relatively hot, brewing temperature, and in which

the water from the water source is relatively cold as compared to the relatively hot brewing temperature.

20. The beverage brewing system of claim 1 in which
the delivery system includes

a controlled brew valve for passing water from the source and the flow meter to the brew basket, and

another controlled mixing valve for passing water from the source and the flow meter to the mixing chamber, and

the controller includes

34

means responsive to the flow meter and to the controlled mixing valve being open for temporarily storing the quantity of water passed through the controlled mixing valve as mixing water, and

means responsive to the flow meter and the brew valve being open for temporarily storing the actual quantity of water being passed through the controlled brew valve as brew water.

21. The beverage brewing system of claim 1 in which the controller is responsive to the flow meter to control the delivery system to deliver only a preselected amount of brew water to the brew basket and a preselected amount of mixing water to the mixing chamber.

22. The beverage brewing system of claim 21 in which the controller is responsive to the flow meter to control the delivery system to deliver only a preselected total measured quantity of water accumulatively delivered to the brew basket and the mixing chamber.

23. The beverage brewing system of claim 1 including means for heating the water in the brew water tank to a preselected temperature relatively higher than that of the water source.

24. The beverage brewing system of claim 1 in which
the brew water tank has an inlet and an outlet, and
the distribution system includes a controlled valve interposed between the flow meter and the inlet of the brew water tank.

25. The beverage brewing system of claim 24 including

means for heating the water to a preselected
temperature at which significant liming may occur, and

a valve-less siphon connection for passing relatively
hot brew water from the outlet of the brew water tank to
the brew basket.

26. The beverage brewing system of claim 25 in which the
inlet to the brew water tank is located a level beneath
that of the outlet from the brew water tank.

27. The beverage brewing system of claim 1 in which the
distribution system includes a pair of controlled valves
for respectively passing water through the flow meter to
the brew basket and through the flow meter to the mixing
chamber.

28. The beverage brewing system of claim 1 including
another flow meter and in which the distribution system has
a pair of controlled valves for respectively passing water
through the one flow meter and one of the controlled valves
to the brew basket and through the other flow meter and the
other of the controlled valves to the mixing chamber.

29. In a beverage brewing system connectable with a source
of water and having a brew basket for holding extract
ingredient and a mixing chamber for receipt of both the
liquid drink extract and a quantity of diluent water for
mixing together into a beverage, the improvement being a
beverage brewing control method comprising the steps of:

measuring the quantity of water flowing from the
source of water with a flow meter; and

36

delivering through a delivery system water from the source to the brew basket to make the liquid extract and to the mixing chamber; and

selectively controlling, with a controller responsive to the flow meter, the delivery system to deliver only a preselected amount of the measured quantity to at least one of the brew basket and to the mixing chamber.

30. The beverage brewing control method of claim 29 in which the

the step of delivering includes controlling a controlled mixing valve of the delivery system for passing water from the source and the flow meter to the mixing chamber, and

responding with the controller to the flow meter for storing the quantity of water passed through the controlled mixing valve.

31. The beverage brewing control method of claim 30 in which the step of delivering includes the steps of

controlling a controlled brew valve of the delivery system for passing water from the source and the flow meter to the brew basket, and

responding with the controller to the flow meter for storing the quantity of water passed through the controlled brew valve.

32. The beverage brewing control method of claim 29 including the steps of

controlling a controlled brew valve of the delivery system for passing water from the source and the flow meter to the brew basket, and

responding with the controller to the flow meter for storing the quantity of water passed through the controlled brew valve.

33. The beverage brewing control method of claim 32 including the steps of

passing water from the brew water tank through a siphon connection to the brew basket, and

controlling the solenoid controlled brew valve to pass water to the brew water tank to force an equal quantity of water in the brew water tank to pass to the brew basket through the siphon connection between the brew water tank and the brew basket.

34. The beverage brewing control method of claim 32 including

sensing with a level sensor in the brew water tank when the brew water tank is at a preselected siphon level above which water is siphoned off through the siphon connection to the brew basket, and

heating with a heating element the brew water in the brew water tank before it is siphoned off to the brew basket.

35. The beverage brewing control method of claim 32 including the steps of

passing water through the controlled brew valve when connected to a side of the brew water tank adjacent a bottom of the brew water tank, and

passing water out of the brew water tank and to the brew basket through a siphon connection when connected to the brew water tank adjacent a top of the brew water tank.

38

36. The beverage brewing control method of claim 29 including the steps of

respectively passing water from the source of water and flow meter to the brew basket and the mixing chamber through two controlled valves of the delivery system, and

controlling with said controller the controlled valves to prevent both from being open at the same time.

37. The beverage brewing control method of claim 36 in which the step of controlling includes

storing an output indication of quantity from the flow meter as brew water when the one of the valves connected to the brew water tank is opened and the other one of the valves is closed, and

storing an output indication of quantity from the flow meter as mixing water when the other one of the valves connected to the mixing chamber is open and the one valve connected to the brew water tank is closed.

38. The beverage brewing control method of claim 29 in which the step of controlling includes the steps of

storing a preselected total quantity of brew water that is to be passed through the brew basket,

comparing amounts of brew water being measured by the flow meter with the preselected total quantity of brew water, and

responding to the comparing means to stop the delivery system from passing more brew water to the brew water tank when the preselected total quantity is equal to the measured quantity of brew water that has passed to the brew water tank.

39. The beverage brewing control method of claim 38 including the steps of

selectively changing the preselected total amount of brew water to a new preselected total amount of brew water that is to be passed through the brew basket, and

storing the new preselected total quantity of brew water.

40. The beverage brewing control method of claim 38 in which the step of controlling includes the steps of

storing a preselected total quantity of beverage to be made by mixing water passed directly into the mixing chamber with the beverage extract, and

comparing the total quantity of water measured by the flow meter with the preselected total quantity of beverage to be made, and

responding to the comparing means to stop the delivery system from passing more water to the mixing chamber when the total measured quantity of water that has passed through the flow meter is equal to the preselected total quantity of beverage to be made.

41. The beverage brewing method of claim 40 including the steps of

selectively changing the preselected total quantity of beverage to be made to a new preselected quantity of beverage to be made, and

storing the new preselected total quantity of beverage to be made.

40

40. The beverage brewing control method claim 29 in which the step of controlling includes the steps of

storing a preselected total quantity of beverage to be made by mixing water passed directly into the mixing chamber with the beverage extract, and

comparing with a comparing means the total quantity of water measured by the flow meter with the preselected total quantity of beverage to be made, and

responding to the comparing means to stop the delivery system from passing more water to the mixing chamber when the total measured quantity of water that has passed through the flow meter is equal to the preselected total quantity of beverage to be made.

41. The beverage brewing control method of claim 29 in which the step of controlling includes the steps of

storing a preselected total quantity of mixing water that is to be passed directly to the brew basket,

comparing amount of mixing water being measured by the flow meter with the preselected total quantity of mixing water, and

responding to the comparing means to stop the delivery system from passing more mixing water to the mixing chamber when the measured quantity of mixing water that has passed to the mixing chamber equals the preselected total quantity of mixing water.

42. The beverage brewing control method of claim 41 including

selectively changing the preselected total quantity of mixing to a new preselected total quantity of mixing water, and

41

storing the new preselected total quantity of mixing water.

43. The beverage brewer control method of claim 29 including the steps of

sensing with a level sensor in the brew water tank when the water has reached a preselected siphon level above which water will be siphoned from the brew water tank,

controlling with means associated with said controller the distribution system to pass water into the brew water tank until the level reaches the preselected siphon level, and

passing hot water out through a siphon connection from the hot water tank to the brew basket when a substantially equal amount of water from the water source is passed through the flow meter and into the brew water tank during a time when the level in the brew water tank is generally at the siphon level.

44. The beverage brewing control method of claim 29 including the steps of

heating with an electrical heater the water in the brew water tank to a preselected, relatively hot, brewing temperature, and in which

the water from the water source is relatively cold as compared to the preselected relatively hot brewing temperature.

45. The beverage brewing control method of claim 29 in which the step of controlling includes the step of commencing delivery of the preselected amount in response

to a manual actuation switch and stopping delivery in
response to the flow meter.

46. The beverage brewing control method of claim 29
including the steps of
        passing water through a controlled brew valve of the
delivery system from the source and the flow meter to the
brew basket,
        passing water through another controlled mixing valve
from the source and the flow meter to the mixing chamber,
and
        with the controller
            responding to the flow meter and to the
        controlled mixing valve being open for temporarily
        storing the quantity of water passed through the
        solenoid controlled mixing valve, and
            responding to the brew valve being open and to
        the flow meter for temporarily storing the actual
        quantity of water being passed through the controlled
        brew valve.

47. The beverage brewing control method of claim 29 in
which the step of controlling includes responding with the
controller to the flow meter to control the delivery system
to deliver only a preselected amount of the measured
quantity to both the brew basket and to the mixing chamber.

48. The beverage brewing control method of claim 47 in
which the step of controlling includes responding with the
controller to the flow meter to control the delivery system
to deliver only a preselected total measured quantity of

43

water accumulatively delivered to the brew basket and the mixing chamber.

49. The beverage brewing control method of claim 29 including the step of heating the water in the brew water tank to a preselected temperature relatively higher than that of the water source.

50. The beverage brewing control method of claim 29 in which

the brew water tank has an inlet and an outlet, and

the distribution system includes a controlled valve interposed between the flow meter and the inlet of the brew water tank.

51. The beverage brewing control method of claim 50 including the steps of

heating the water to a preselected temperature at which significant liming may occur, and

passing with a valve-less siphon connection relatively hot brew water from the outlet of the brew water tank to the brew basket.

52. The beverage brewing control method of claim 51 in which the inlet to the brew water tank is located at a level beneath that of the outlet from the brew water tank.

53. The beverage brewing control method of claim 51 in which the outlet is located adjacent a top of the brew water tank.

54. The beverage brewing control method of claim 29 in which the step of selectively controlling includes the step of selectively changing the preselected amount of the measured quantity to be delivered to the at least one of the brew basket and to the mixing chamber.

55. The beverage brewing control method of claim 29 in which the step of selectively controlling includes the step of selectively changing preselected amounts of the measured quantity to be delivered to both the brew basket and to the mixing chamber.

56. The beverage brewing control method of claim 29 including another flow meter and in which the step of selectively controlling includes the steps of

controlling the passing of water through the one flow meter and one of the controlled valves to the brew basket in response to the amount of water measured by the one flow meter, and

controlling the passing of water through the other one of the flow meters and the other one of the controlled valves to the mixing chamber in response to the amount of water measured by the other one of the flow meters. chamber.

57. In a beverage brewer, the improvement being a control system, comprising the combination of:

means for measuring with a flow meter a quantity of water being passed to the brewer from an external source of water; and

45

means for controlling a water distribution system of the brewer in response to the measuring means.

58. The beverage brewer of claim 57 in which the measuring means is a paddle-wheel type flow meter with one of an electrical and an electromagnetic output representative of the revolutions per minute of the paddle-wheel.

59. The beverage brewer of claim 57 in which the controlling means includes a computer responsive to the flow meter for controlling the operation of
    one controlled valve for passing water directly from the flow meter to a mixing chamber, and
    another controlled valve for passing water from the flow meter to the mixing chamber via a brew basket containing brew ingredient.

60. The beverage brewer of claim 57 in which the means for controlling includes
    a computer with
        a memory for storing actual amounts of measurements of flow for at least one given location,
        a memory for storing a preselected total quantity of flow for the at least one given location, and
        means for comparing the actual measurements of flow being stored with at least one previously stored preselected total quantity for the at least one location to control the controlled valves to receive only the preselected total quantity of water.

61. The beverage brewer of claim 57 including
    a brew basket and a mixing chamber, and

46

the controlling means includes means for selectively varying proportional amount of water delivered to the brew basket and relative to the amount of water delivered to the mixing chamber.

62. The beverage brewer of claim 61 in which the controlling means includes means for selectively changing the total accumulative amounts of water delivered to both the brew basket and the mixing chamber without changing the proportional amount.

63. The beverage brewer of claim 57 including

a brew basket and a mixing chamber, and

the controlling means includes means for controlling the total accumulative amount delivered to both the brew basket and the mixing chamber.

64. In a hot beverage brewer, the improvement being a beverage brewing control method comprising the steps of:

measuring a quantity of water being passed to the brewer from an external source of water; and

controlling a water distribution system of the brewer in response to the measuring means.

65. The beverage brewing control method of claim 64 in which the measuring means is a paddle-wheel type flow meter with one of an electrical and a magnetic output for representative of the revolutions per minute of the paddle-wheel.

66. The beverage brewing control method of claim 64 in which the step of controlling includes the steps of

47

responding with a computer to the quantity being measured for controlling the operation of

one controlled valve for passing water directly from the flow meter to a mixing chamber, and

another controlled valve for passing water from the flow meter to the mixing chamber via a brew basket containing brew ingredient.

67. The beverage brewing control method of claim 64 in which the step of controlling includes the steps

storing in a memory of a computer actual amounts of measurements of flow for at least one given location,

prestoring a preselected total quantity of flow for the at least one given location in a memory of the computer, and

comparing the actual measurements of flow being stored with at least one prestored, preselected total quantity of water for the at least one location to control a controlled valve to pass only the preselected total quantity of water.

68. The beverage brewing control method of claim 64 in which

the brewer includes a brew basket and a mixing chamber, and

the step of controlling includes the steps of selectively varying proportional amounts of water delivered to the brew basket relative to a measured amount of water delivered to the mixing chamber.

69. The beverage brewing control method of claim 68 in which the step of controlling includes the step of selectively changing the total accumulative amounts of water delivered to both the brew basket and the mixing chamber without changing the proportional amounts.

70. The beverage brewing control method of claim 64 in which

the brewer includes a brew basket and a mixing chamber, and in which

the step of controlling includes the step of controlling the total accumulative amount delivered to both the brew basket and the mixing chamber in response.